GLASS PAINTING:

"Vessels - Through fragments of colour and architectonic spaces"

A Thesis on glass painting and techniques submitted as part of the final year assessment for a Bachelor of Visual Arts Degree, Canberra Institute of the Arts, 1989.

Based on a series of works "Vessels - Through fragments of colour and architectonic spaces".

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RATIONALE

The works I have submitted for my final assessment are titled "Vessels - Through fragments of colour and architectonic spaces", in a numbered series.

When I began this project I tried to make the vessel forms expressly to support glass painting. Both the form and the painting needed to interact as a focal point as well as a sensory symbol or metaphor allowing the contained vessel space to play a part in its transformation into architectural spaces.

I identify good glass painting as having a character all of its own. Glass painters can use images to attain a new level of thought based on linking graphic imagery on curved or architectural surfaces, through to inner implied volume, so generating a sense of highly complex space and presence. Gerrit Rietveld produced furniture which looked like a painting; not as a mental soother, but as a mental stimulator. It was as if he were possessed with a powerful drive towards architectonic form.

In my work the vessel form and architecture are perceived as being an interconnected interior through a variety of philosophical and social concepts; the vessel form being a container which is itself contained within the architectural container of its location. Through architecture and the use of colour, the vessel form has been used as a framework to convey the expression of the location of an event, and is reduced to the essential meaning I perceive the finished work relating to.

Colour is light and, as light changes, so too does colour. Colour has been used to play with, rather than conflict with, natural light. The daily variations of light from morning through to late afternoon, from overcast to sunny skies, also create infinite modulations of colour and tone, helping to produce a stimulating and refreshing physical environment.

Colour has been given a major and multifaceted role throughout my working process which has been for me, both interesting and exciting. The fragmentation of the colours used have been composed in such a way that they allow a continuity between episodes - as if one is in the midst of an endless environmental process.

Of course there is the question of space. Do the vessel forms take control of the three dimensions of space? As the maker of these vessels I felt it important to direct the viewers' attention to linger in a space which in ways is not of the common world. To be a common thing in a common space as the Swiss sculptor, painter and poet Alberto Giacometti pointed out - is not expression.

The vessel form is a three dimensional form, as is architecture. For the viewer a three dimensional form should be able to move up and down, around, and in and out in ways to give a contour to space by creating not one, but a series of contained implied volumes within the surfaces of the works, as well as demonstrating shaped movements into the directions of space.

The viewer, and I as the maker, may need to look beyond what is there to understand what is clearly meant to be intelligible shaped contents, sequences of voids within the forms - centered in the case of the blown forms and balanced in the case of the fused painted inlay pieces. The surfaces do not vanish but remains at work as a contributor to the meaning.

THEME OF WORK

There are many elements related to glass that I try to take into consideration when producing work for a specific objective. Elements such as light, type of glass, colour, surroundings and the subject matter have to be evaluated as part of the working process. This process cannot be fully formulated ahead of time. However I have found some preliminary ground work has been to my advantage in focusing a direction for my initial idea.

Architecture and the Vessel

In thinking my work through, I have drawn upon my own personal experiences and perceptions towards architecture and the vessel form as being containers. Like the Italian sculptor of the late 19th century Medardo Rosso, I have tried to imagine the setting in which I would like my work to appear. I like to consider the location of the work, the light it would receive, interior surroundings, existing or proposed colour of the walls, furnishing and architectural characteristics. These impressions are then reduced to their essential meaning by the use of line, plane, shape and colour.

Location and Space

By using the framework of location, the finished forms, through their scale, angles and spaces, reflect some of the architectural qualities of the type of space that I perceive the finished work to relate to. For example, any of Australian architect Glen Murcutt's buildings, Philip Cox's Yallara Tourist Village at Ayers Rock, or Le Corbusier's

Ronchamp Chapel are just a few of the buildings that I perceive my work to be able to interact with.

Locations are a way in which objects can come together in unexpected relationships. This can occur with a change of scale or using odd angles emphasising the spaces that exist between objects and an isolation of the parts themselves. So via architecture the decorative object has new spatial relationships which are in a human scale.

The interaction with the space we live in is a crucial part of every day life. The relationship and function of an object can only be completed when it is perceived as a whole, when all of the elements are in place and function within a location. By this I mean that all artworks regardless of the medium being used, have a specific function for the maker. Through locations objects can act as architectural elements within the areas of space that are experienced between other objects that already exist.

So space and location works in several ways. It is the initial catalyst or experience that is meant to interact within new locations and is meant to influence the viewer.

On the other hand, people viewing the work may not have the direct knowledge of the location or space that spawned the idea.

I would hope that the finished forms will still convey to them some relationship with architectural spaces as I have intended. I think it is also important to note, as I have mentioned in my rationale of the works provided, that Gerrit Reitveldt also interacted his furniture with the spaces of the house and building.

Matisse wrote - "Given a correct fundamental attitude, it would turn out that the procedure of making a picture is no less logical than that of building a house. The human aspect need not to be considered. One has it or not; if one has it, it will show up in the work anyway".[1]

Colour

Throughout my studies I have especially found Kandinsky's books on art theory and Johannes Itten's book - "The Elements of Colour" to be most beneficial in my understanding of art theory and colour. For example in the pyschological understanding of colour Itten refers to the meaning of colour: "Violet is the hue of piety, chaos, death and exaltation; in blue-violet solitude and dedication and in red-violet divine love and spiritual domination".[2]

Both Itten and Kandinsky also refer to the interpretation of mixed colour corresponding to the mixture of the interpretation of the original colours. My interpretation is as follows and is a combination of both analogies. Yellow is the colour of bright knowledge; blue represents submissive faith; reds are for material force. Orange should therefore represent proud self respect and green is the colour of sympathy. Itten did not see black and white as colour, although Kandinsky saw white as the colour of joy and black as the colour of death. I prefer to perceive black as the colour of rebirth, because with death a new life is born; a type of reincarnation.

1 Faber Birren, editor, Johannes Itten - The Elements of Colour, New York 1967, pp 92.

2 Johannes Itten - The Elements of Colour, pp 89.

In the works I have produced in this final assessment colour in interpreted as a juxtaposition of two or more colours in such a way that they jointly produce a distinctive expression. Itten also used colour in this way with his use of simultaneous contract theories.

The selection of hues, their location, orientation and their contrast relationships within a composition are for me important factors. I compare colour to energy. The effects of light reflecting or coming through coloured glass has the power to change the atmosphere of a room and to capture the attention of the viewer.

Compared to the many intense, sometimes too powerfull colours found in manufactured glass, the hues from the use of painted enamels and lustres vary from muted and delicate to strong but subtly intense. Each colour has its own degree of opacity and translucency. The intensities of the enamels and lustres when painted onto a glass surface depends on the density with which these mediums are applied and also expands the range of tonal selection.

For the rest of this paper I am going to discuss some of my thoughts on some of the technical aspect of using paint on glass and the types of paint, equipment and mixing agents that I have used in the production of my work.

Following pages:

HAND BLOWN VESSEL FORM:

(painted with lustres and enamels, cross hatched, stippled and sand blasted)

FUSED PAINTED INLAY FORM:

(fused painted layers of glass, crosshatched, stippled, hand ground and polished)

MATERIALS & EQUIPMENT

Paints

There are many kinds of paints, with varying firing temperatures, which can be used with glass. In my works this year I have used a variety of enamels and lustres:

- high firing enamels such as the "David Hopper" range of glass paints
- low firing enamels such as the "Blythe Glass Enamel" range and the "Reusche" range of glass bending and glass stainers
- low firing lustres such as those produced by the German chemical companies Degussa and Dresden.

These paints may be applied directly to the glass surface and fired, or they may be used in a two stage technique where paint is applied to the glass surface as a film-like coating and fired to provide a pre-fired surface to which the further paints can be applied to achieve the required colour and form. The use a pre-fired surface not only enhances the colours being applied, but also helps control the fluidity of the paints during the application on to the surface of the vessels being painted.

Enamels

Enamels are made from finely powdered glass of different colours. They may be mixed together to achieve a variety of shades, as well as being combined with mixing agents and binders such as lavender oil, copaibe and Damar varnish for oil based paints, and water

and gum arabic for water based paints. These products come either in powered form or pre-mixed with a painting medium.

The "David Hopper" range of oil based enamels are pre-made and are sold in seven colours. They can be fired onto the glass at temperatures between 740 - 1200° C. My use of these paints has been limited to flat work and some experimentation in blown graal techniques. Because of the oil content of these paints, I pre-fire the surface before it is being encased in glass.

The "Blythe Glass Enamel" range of enamels also comes in a range of seven mixable colours. They are made in four different ranges of firing temperatures and can be mixed with all the mixing agents and binders. The firing ranges of these paints are:

V2800 series 520 - 540° C

V3800 series 550 - 570° C

V5800 series 590 - 610° C

V6800 series 620 - 720° C

The "Reusche" range of glass bending and glass stainers are sold in powder form and mix well in water or oil to a fine creamy substance. I have found that the "Reusche's" glass bending white enamel is particularly effective as a pre-fired surface for further painting on blown vessel forms. However I have encountered problems with fading intensity in some of the "Reusche" range if fired at temperatures of 640°C. This applies particularly to the range of reds.

Lustres

The chemical structure of lustres is distinct from the other paints I use in that they do not contain any glass. Lustres are made from various metallic oxides such as lead borate, bismuth oxide, silver carbonate and silver chloride. They are prepared as a resin that is diluted with a mixing agent.

Most of the lustres used in my work are manufactured by the German chemical companies Degussa and Dresden. These lustres are painted onto the surface of the glass as a film-like coating and are fired in the kiln at temperatures of 540 - 815°C. I have found the Degussa matt white provides a very good initial pre-fired surface for latter applications.

Mixing Agents/Binders

All of the powdered based paints require mixing with another medium for application onto the glass surface. They may be mixed with a variety of liquids such a distilled turpentine, pine oil, lavender oil or water.

Compatible binders are added to the mixed paints to hold the pigments of the paint to the glass surface on application. Permanent adhesion to the surface is achieved when the piece is fired in the kiln. These binders include damar varnish and copaibe oil for oil based paints and gum arabic for water based paints.

Paint Grinding Tools

Paints and mixing agents are combined and ground to the required consistency and tone on a pallete. The mixed paint should be soft, but with sufficient consistency to retain its shape when it is pushed to one end of the pallete.

My preferred method of grinding is by using a flexible pallete knife with a good spring action. A glass muller (a solid glass grinding tool) can also be used for grinding.

Brushes

I divide the various brushes I use in my work into three categories;

- applicators
- scrub brushes
- blending brushes

Applicator brushes are used to apply the wet paint onto the surface of the glass. They may be made from sable and ox hair and are used in a variety of sizes for different linear and tonal work.

The scrub brushes are used to remove areas of paint from the glass surface prior to firing. These brushes are made from hog hair. I have found that white hog hair brushes that have been burned down are very effective.

In my work it is the third type of brush, used for blending the paint on the glass surface, which is the most important and versatile. This brush creates the final surface with its tones and textures prior to firing. A Badger Hair softener is my preferred brush and is excellent for forming stipples and textures.

The condition of all types of brushes is vitally important and great attention should be paid to their cleaning. This involves washing in warm soapy water or lavender oil (for oil paints) depending on the paint types and mixing agents used.

Light Box

One of the most important pieces of equipment I work with is the Light Box. This consists of a sheet of glass in an enclosed frame which is lit from below to provide an illuminated surface on which to work. This is where I begin to paint on the glass. At this point I analyse every brush stroke, watch the flow of paint, its density and its adhesion to the glass surface. It is a time when I have an image of what textures and forms will be displayed in the finished work. Evaluation of whether those aims are attained however is only possible after the piece has been fired and is viewed in natural light.

Banding Wheel

The Banding Wheel is a revolving wheel on a fixed base. It allows a blown form placed on it to be viewed from all angles and for a smooth application of paint to be made across the surface.

Glass Grinding

Most of the grinding in my work is done by hand using a slurry mix made from one of three types of carborundum grits mixed with water. 220 grit is used in the first stage of grinding. It is a heavy grit that enables me to grind back the surfaces and edges of the fused inlay forms to the desired shape. I then proceed to the 400 size grit. This helps to smooth the surfaces and prepares the glass for the final grinding process with 600 size grit. After this the individual edges and surfaces are then polished mechanically on the linisher using a cork belt.

The Kiln

The kilns that I have used in the workshop are all electric. Their temperature range is to 1000°C. They are computerized in a three stage program. Some are top loading with elements down two sides of the kiln. Others are front loading, two with elements in the top of the kiln and two with elements on four sides of the interior including the door. Kiln shelves are then placed in the centre of the kiln on props to enable an overall heat.

THOUGHTS ON THE TECHNIQUES OF GLASS PAINTING

Glass is by nature transparent. By applying a layer of paint, I arrest the light on the surface of the glass. I then remove parts of the paint with a variety of tools to see the glass again. The way in which contrasts can be created between clear unpainted areas and painted areas is an important quality for my painting on glass. Through these contrasts, with their interplay of light, are created the volumes, spaces and architectural relationships I am attempting to portray in this series of my works.

These works involve vessels requiring two different production methods. The first involves blown pieces with enamels and lustres fused to the surface. In the second the enamels and lustres are fused (through kiln firing) between layers of cut glass which are slumped, ground and fitted together to form the finished vessel.

Following are some thoughts on the techniques used in both cases from design preparation to the application of paints to the surfaces, and through firing and grinding to the finished form.

Design Preparation

The theory of design and its presentation to the point where the process of translating that creative idea to glass and paint is outside the considerations of these rather narrow technical considerations of glass painting. However I believe that certain fundamentals apply in both putting down ones ideas for a design on paper and as a basis for applying the paints on the glass form.

For me, the preparatory drawing need not be a meticulously rendered accurately scaled drawing on paper. In my initial drawings of the design I begin with line, to delineate forms and spaces; thick and thin lines, deliniating movement and voids and hopefully their relationships in the finished forms. The drawings prepare the ground work. The reality is for my technical abilities with the paints and glass to match my visualisations at this stage of the creative process.

Paint Selection and Preparation

Powdered enamels require mixing with a variety of mixing agents and binders mentioned in the previous section. The mixture is ground on a pallet with a knife or a glass muller to the required consistency. Lengthy grinding of each paint mix is required to achieve a smooth and easily applicable paint.

It is important to keep mixed paints away from dirt and dust. Contamination of the paint mix will not allow a smooth application to the glass surface. Many people prefer to mix fresh paints daily, however I have found it quite practical to keep mixed paints for longer periods. If the paint mix is to be used the next day, I cover the paint with a plastic jar overnight. Paints kept wet and under cover require only a little more grinding the following day to make them softer and smoother and ready for application. I have also noted that wet paint does not age after 48 hours, but does tend to become hard to use after about a week.

It is equally important to achieve the correct fluidity of the paint for a smooth and effective application. Regardless of the choice made to paint with either oil or water based paints, the right flow of paint from the brush is essential. This applies to both application directly onto the glass surface, or when the paint is to be applied and fired over a matted surface. If the paint is not diluted enough, it will cling to the hairs of the brush like a lump and drag over the surface, leaving a thick heavy line. If the paint is diluted too much, it will not cover the glass evenly. The ideal fluidity for paint is when it flows smoothly from the brush, covering the glass with a thin opaque coat of paint.

There are two different firing ranges for the enamels I have used in my work. For the vessel forms the paints are used with both oil and water and fired at low temperatures between 540 - 815°C. There are also some incompatibilities when combining some of the lustres wet onto the surface of the glass, although this can be used to advantage. Compatibilities also differ depending on the manufacturers' preparation of the lustres produced.

When making the fused painted inlay forms, to use high firing oil based enamels is very time consuming.

Oil based enamels or lustres fired between layers of glass will produce extra bubbles between the layers and can, depending on how thickly the oil based enamel or lustres are applied, tend to fry, causing burnout to occur between the layers of glass.

This effect may be desirable in some cases when using oil based enamels or lustres between layers of glass. The various layers are pre-fired, then layered and fused together to form the desired effect. Where possible I have used water based enamels, as these allow the painting and the fusing of the painted glass surfaces to the done at the same time.

Application Techniques

On the two types of forms in my work this year, I have also used different application techniques. Some works involve the application of paints directly onto the surface of the glass which is then fired. My painted inlay slumped forms employ this technique. Paints are applied directly onto layers of glass which are then fused together to form individual pieces which are then ground, polished, slumped and glued together to achieve the final form of the work.

Good quality brushes are essential in achieving correct application to the glass surface. A good quality brush will display a strong spring action, so when one stroke is completed the brush is ready to start the next stroke immediately. I try to place each stroke firmly next to the last stroke in an effort to make the application as even as possible. The best way I have found to accomplish this is by swirling and stippling with a brush during applications.

The other painting technique I have employed in this series of works involves the use of a translucent pre-fired surface to which the various enamels and lustres are applied in the above manner. This technique has been used on the blown vessel forms I have produced this year.

I was introduced to this technique in 1987, when the German glass artist Isgard Moje-Wohlgemuth demonstrated the technique during a period at the Canberra School of Art.

Not only does a pre-fired surface enhance the richness of the colours being applied, but it also helps in the control of the fluidity of the lustres during application onto the surface of the vessel being painted. The richness in colour that can be produced by the use of a translucent pre-fired surface can also be used to juxtapose spatial qualities within the transparencies of glass. Thus the pre-fired surface is a base for controlling the translucency, dimensions, contrast and balance of the form as a completed work.

When I am painting on these vessel forms, the initial pre-fired surface is painted with glass enamels. The three types of paints that I have used for this purpose are Degussa's matt white, Reusche's glass bending white and Blythe's white enamels. It is important to keep in mind that a satin or matt surface will provide a satin or matt finish and a gloss surface will provide a gloss finish.

The enamels for the pre-fired surface can be applied in a variety of ways, from conventional applications with brushes, or through the use of material, sponges, sprays and knives. This matted paint surface will then provide a ground on which to work on. The density and translucency of this pre-fired surface is controlled by the amount of paint being applied. What I hope to achieve when applying these pre-fired surfaces is for the glass to appear flat and without sparkle - a base to work on. It is not heavily applied because the effects are clearly visible in the thinnest of applications. Before it is fired, some of the matted colour may be removed with the sharpened end of a paint brush, needles or scrub brushes to allow natural light to travel unobstructed through some areas of the glass.

The blown vessel form, with its translucent surface is then fired in a vented kiln. I then apply the lustres which make up the finished painted surface as film-like coatings over the pre-fired surface. The vessel is then fired again at low temperature (570°C) to produce the final form with a mother of pearl or an irridescent sheen.

Firing

To begin the firing process, the kilns are vented to 300°C to allow the oils in the enamel and lustre mixes on the surface to burn out. The kiln is then closed and allowed to finish its cycle.

The blown vessels and the fused painted inlay forms are fired in different ways. The vessels, depending on the thickness of the glass, are fired gradually to low temperatures of 570°C. The fused painted inlay forms are gradually fired to temperatures of 860°C.

The electric kilns used in the workshope provide a radiant heat. Depending on where the elements are situated and the type of work I am doing, different precautions are taken. For example, I use the top loading kilns for firing the blown vessel forms. I try to locate the vessel in the middle of the kiln to ensure an overall heat to the surface of the glass.

When firing the fused painted inlay forms I need to use the larger kilns for this work. The individual pieces are laid flat onto a kiln shelf. They are then encased in fibrefax walls that follows the contour of the individual shapes. The kiln shelf is then placed in the centre of the kiln to ensure an overall heat to all areas of the glass.

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Degussa AG
Geschaftsberich Keramische Farber
Postfach 110533 D6000
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